Surface Mount

Power Splitter/Combiner

top hat®

TCP-2-152-75X+

2 Way-0°   75Ω   5 to 1500 MHz

The Big Deal
- Wideband, 5 to 1500 MHz
- Good power handling, 0.5W as a splitter
- Low insertion loss, 0.8 dB
- Low unbalance, 0.25 dB, 1.5˚

CASE STYLE: DB1627

Product Overview

Mini-Circuits' TCP-2-152-75X+ is a 75Ω 2-way 0˚ surface-mount power splitter/combiner covering the 5 to 1500 MHz frequency range, supporting bandwidth requirements for DOCSIS® 3.1 systems and equipment, as well as other broadband applications. This model can handle up to 0.5W RF input power as a splitter, and provides low insertion loss and low phase and amplitude unbalance. It features core and wire construction mounted on a 6-lead plastic base (0.16 x 0.15 x 0.16") with Mini-Circuits' TopHat® feature to improve speed and accuracy of pick and place assembly. This design requires external capacitors and resistors for impedance matching and cycling isolation between the output signals (refer to electrical schematic).

Key Features

Feature	Advantages
Wideband, 5 to 1500 MHz	Suitable for many broadband applications including DOCSIS® 3.1 systems and equipment, VHF/UHF, CATV, cellular, and more.
Low insertion loss, 0.8 dB	The combination of 0.5W power handling and low insertion loss makes it a suitable candidate for distributing signals while maintaining signal power.
Good isolation, 28 dB	Minimizes interference between ports
Low unbalance: • 0.25 dB amplitude unbalance • 1.5˚ phase unbalance	This model produces nearly equal output signals, making it ideal for use in parallel path /multichannel systems.
Top Hat® Feature	Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection.

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Power Splitter/Combiner   TCP-2-152-75X+

2 Way-0°   75Ω   5 to 1500 MHz

Features
• low insertion, 0.8 dB typ.
• excellent amplitude unbalance, 0.2 dB typ.
• very good phase unbalance, 1.5 deg. typ.
• external resistor & capacitor required
• aqueous washable
• leads for excellent solderability
• low cost

Applications
• DOCSIS® 3.1 Systems
• VHF/UHF
• CATV
• cellular

Generic photo used for illustration purposes only

CASE STYLE: DB1627

+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500
13"	1000, 2000

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1500	MHz
Insertion Loss Above 3.0 dB	5-50	—	0.4	0.7	dB
	50-1000	—	0.7	1.2	
	1000-1250	—	1.0	1.7	
	1250-1500	—	1.3	2.7	
Isolation	5-50	22	28	—	dB
	50-1000	21	28	—	
	1000-1250	20	28	—	
	1250-1500	16	25	—	
Phase Unbalance	5-50	—	1.0	3.0	Degree
	50-1000	—	1.5	4.0	
	1000-1250	—	2.0	5.0	
	1250-1500	—	2.0	6.0	
Amplitude Unbalance	5-50	—	0.2	0.4	dB
	50-1000	—	0.2	0.5	
	1000-1250	—	0.25	0.6	
	1250-1500	—	0.30	0.7	
VSWR (Port S)	5-50	—	1.08	1.15	:1
	50-1000	—	1.15	1.3	
	1000-1250	—	1.25	1.45	
	1250-1500	—	1.3	1.75	
VSWR (Port 1-2)	5-50	—	1.3	1.5	:1
	50-1000	—	1.2	1.35	
	1000-1250	—	1.3	1.6	
	1250-1500	—	1.55	1.95	

Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	0.5W max.

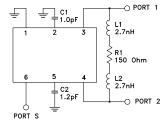Permanent damage may occur if any of these limits are exceeded.

Pin Connections

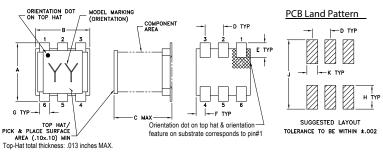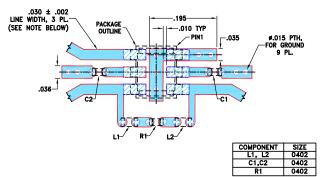| Function	Pin Number	Function	Pin Number
Sum port	6	Ext. capacitor 1.0pF	2 to Gnd
Port 1	3	Ext. capacitor 1.2pF	5 to Gnd
Port 2	4	Ext. Components (Inductor 2.7 nH, Resistor 150Ω, Inductor 2.7nH in Series	3,4
Ground	1		

Product Marking

SW

Electrical Schematic

Mini-Circuits®

TCP-2-152-75X+

Outline Drawing

ORIENTATION DOT ON TOP HAT
MODEL MARKING (ORIENTATION)
COMPONENT AREA

TOP HAT/ PICK & PLACE SURFACE AREA (.10x.10) MIN
Top-Hat total thickness: .013 inches MAX.

Orientation dot on top hat & orientation feature on substrate corresponds to pin#1

PCB Land Pattern

SUGGESTED LAYOUT TOLERANCE TO BE WITHIN ±.002

Outline Dimensions ($\frac{inch}{mm}$)

A	B	C	D	E	F
.160	.150	.160	.050	.040	.025
4.06	3.81	4.06	1.27	1.02	0.64

G	H	J	K		wt
.028	.065	.190	.030		grams
0.71	1.65	4.83	0.76		0.15

Demo Board MCL P/N: TB-835+
Suggested PCB Layout (PL-457)

.030 ± .002 LINE WIDTH, 3 PL. (SEE NOTE BELOW)
PACKAGE OUTLINE
.195
.010 TYP
PIN1
.035
ø.015 PTH, FOR GROUND 9 PL.
.036
C2
C1
L1 R1 L2

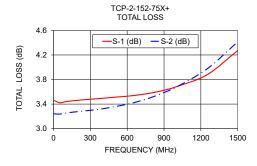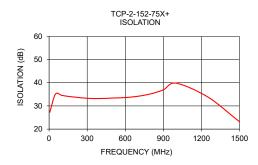| COMPONENT	SIZE
L1, L2	0402
C1,C2	0402
R1	0402

NOTES:
1. TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
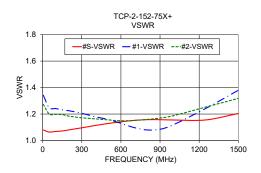
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

Typical Performance Data

Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
5	3.46	3.24	0.22	27.24	0.82	1.08	1.34	1.27
50	3.42	3.24	0.19	35.10	0.05	1.06	1.25	1.20
100	3.44	3.25	0.19	34.55	0.19	1.07	1.24	1.20
150	3.45	3.27	0.19	34.13	0.30	1.07	1.23	1.20
200	3.46	3.28	0.18	33.83	0.39	1.08	1.23	1.18
300	3.48	3.30	0.18	33.30	0.56	1.10	1.21	1.17
400	3.49	3.32	0.17	33.19	0.71	1.11	1.18	1.16
500	3.51	3.36	0.15	33.41	0.80	1.13	1.16	1.16
600	3.53	3.40	0.13	33.62	0.90	1.14	1.13	1.15
700	3.55	3.45	0.10	34.18	0.99	1.15	1.10	1.15
800	3.58	3.51	0.07	35.21	1.03	1.16	1.08	1.16
900	3.63	3.59	0.04	36.95	1.06	1.16	1.08	1.17
1000	3.68	3.68	0.01	39.83	1.09	1.16	1.12	1.19
1250	3.88	3.97	0.10	33.87	1.19	1.16	1.24	1.25
1500	4.27	4.41	0.14	23.17	1.56	1.20	1.38	1.32

1. Total Loss = Insertion Loss + 3dB splitter loss.

TCP-2-152-75X+ TOTAL LOSS

TCP-2-152-75X+ ISOLATION

TCP-2-152-75X+ VSWR

Additional Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

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